REMARKS

Claims 1-18 are pending in the application. Claims 14-15, 17-18 have been allowed.

The Examiner's allowance of claims 14-18 and indication that claim 4 contains allowable subject matter is greatly appreciated. However, for the reasons set forth below, Applicant respectfully submits that the invention recited in claims 1-3 and 5-13 are also patentably distinguishable over the prior art.

The drawings attached to this paper are formal drawings to replace the informal drawings filed originally with the application. No changes have been made to the substance of the drawings.

Claims 1-3, 5-8, 10, 13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba (U.S. Patent No. 6,081,018) in view of Grinberg (U.S. Patent No. 5,764,389).

The claimed invention is directed to an image sensor formed on a semiconductor substrate. In particular, independent claim 1 recites "an array of sensing pixels fabricated over [a] substrate," and "an optical mask layer formed over said substrate in an optical path of [] input radiation, said optical mask layer having a plurality of optical holographic elements."

Nakashiba teaches a conventional image sensor using color filters and having a plurality of microlens formed over the sensor array. The Office Action concedes that there is no teaching or suggestion in Nakashiba to substitute the color filter and microlens arrangement with an optical mask layer having a plurality of holographic

optical elements. To address Nakashiba's shortcomings in this regard, the Office Action proposes to combine the disclosure of Nakashiba with that of Grinberg.

Grinberg teaches a holographic color filter arrangement in a color display system. In particular, Grinberg's display system is an LCD display. Nowhere does Grinberg disclose or suggest using the holographic color filter arrangement in environments other than liquid crystal displays, much less in the specific field of semiconductor based image sensors.

Simply because color filter sensor arrays and holographic optical elements are separately known in the general body of prior knowledge does not make it obvious to combine them together, particularly when there is nothing in either Nakashiba or Grinberg to suggest to one of ordinary skill in the art to substitute the microlens and color filter arrangement of Nakashiba with the holographic color filters of Grinberg. As recognized by the Federal Circuit in Panduit Corp. v. Dennison Mfg. Co., "[v]irtually all inventions are necessarily combinations of old elements." 810 F.2d 1561, 1 U.S.P.Q.2d 1593, 1603, *cert. den.*, 481 U.S. 1052 (1987). "But the elements are capable of an infinity of permutations," Judge Learned Hand observed in B.G. Corp. v. Walter Kidde & Co., Inc., "and the selections of that group which proves serviceable to a given need may require a high degree of originality. It is that act of selections which is the invention." 79 F.2d 20, 26 U.S.P.Q. 288, 289 (2d Cir. 1935). Thus, in establishing obviousness by combining or modifying prior art references, it is required that the teaching, suggestion or incentive for combining the references be found in the prior art.

The requirement for demonstrating motivation in the references when rejecting a claim under obviousness is well-established in case law. In In re Mills, the Federal Circuit held that "[w]hile [the prior art] apparatus may be capable of being modified to run the way [applicant's] apparatus is claimed, there must be a suggestion

or motivation in the reference to do so." 916 F.2d 680, 682, 16 U.S.P.Q.2d 1430, 1432 (1990). Similarly, in Ex Parte Levengood, the Board of Appeals reversed a rejection, stating that "[a]t best, the examiner's comments regarding obviousness amount to an assertion that one of ordinary skill in the relevant art would have been able to arrive at the appellant's invention because he had the necessary skills to carry out the requisite process steps. This is an inappropriate standard for obviousness." 28 U.S.P.Q.2d 1300, 1301 (Bd. Pat. App. Int. 1993). *See also* In re Bond, 910 F.2d 831, 834, 15 U.S.P.Q.2d 1566, 1568 (Fed. Cir. 1990); MPEP 2143.01.

Since neither Nakashiba nor Grinberg provides any suggestion to substitute the holographic color filter arrangement of Grinberg for the color filter and microlens arrangement in the semiconductor-based image sensor disclosed in Nakashiba, Applicant respectfully submits that the claimed invention is not rendered by Nakashiba and Grinberg, either alone or in combination. Accordingly, withdrawal of this rejection is courteously requested.

Claim 9 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba in view of Grinberg and further in view of Clarke (U.S. Patent No. 6,057,538).

Claim 9 depends from claim 1 and as such, incorporate each of the features recited in the latter. Thus, claim 9 is also patentably distinguishable over the combination of Nakashiba and Grinberg. The addition of Clarke to the combination does not provide the teaching or suggestion necessary to render obvious the claimed invention.

Clarke teaches another semiconductor-based image sensor having a microlens arrangement for focusing light rays on the pixels. Clarke, like Nakashiba, does not suggest substituting the microlens focusing arrangement with a holographic

optical mask layer. Thus, the cited combination of Nakashiba, Grinberg and Clarke is also insufficient to render obvious the claimed invention. In view of such, withdrawal of this rejection is respectfully requested.

Claim 12 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba in view of Grinberg and further in view of Gambogi (U.S. Patent No. 6,081,354).

Claim 12 depends from claim 1 and as such, incorporates each of the features recited in claim 1. Claim 12 therefore is also patentably distinguishable over the combination of Nakashiba and Grinberg for the same reasons attributable to claim 1. The addition of Gamboogi to the combination is still insufficient to support a conclusion of obviousness with respect to the claimed invention.

Gamboogi is similar to Grinberg in that it teaches a holographic color filter arrangement used to improve the performance of liquid crystal display assemblies (see col. 1, lns. 19-28). Like Grinberg, there is no mention in Gamboogi of the desirability to place the disclosed holographic color filter arrangement in a semiconductor-based image sensor. Without any suggestion in this regard, the claimed invention cannot be rendered obvious by the cited combination of Nakashiba, Grinberg and Gamboogi. Thus, Applicant respectfully requests that this rejection be withdrawn.

Claim 11 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba in view of Grinberg and further in view of McLeod (U.S. Patent No. 6,020,985).

Claim 11 depends from claim 1 and therefore incorporates all of the features recited in the latter. As such, claim 11 also distinguishes over Nakashiba and Grinberg

for at least the same reasons attributable to claim 1. Even upon adding McLeod to the cited combination, the claimed invention is still not rendered obvious.

McLeod teaches a tape media for storing holograms. McLeod is completely silent as to holographic optical elements and is irrelevant to the field of semiconductor-based image sensors. Thus, McLeod also fails to provide the missing teaching, suggestion or motivation for substituting the microlens and color filter arrangement of Nakashiba with the holographic color filter arrangement disclosed in Grinberg.

The Office Action specifically points to McLeod's disclosure of absorption holograms as meeting the claimed feature of an optically absorptive holographic optical element. However, a holographic optical element is entirely different from a hologram. As disclosed in Applicant's specification, a holographic optical element is an element through which light passes and which modifies a property of the input light. A hologram is a pattern produced on a photosensitive medium that has been exposed by holography and then photographically developed. Thus, in addition to proving insufficient to support the combination of Nakashiba and Grinberg to render the invention of claim 1 (and all dependent claims) obvious, McLeod also fails to teach or suggest an absorptive holographic optical element as recited in claim 12.

Based on the foregoing discussion, Applicant respectfully submits that this rejection should be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. According, the Examiner is respectfully requested to favorably reconsider the present application and to pass this application to issue.

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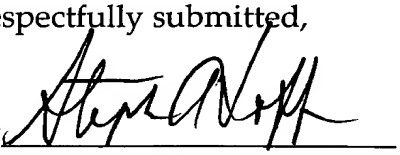
Respectfully submitted,

By 

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